



# Development of a Group Counseling Model Using the CBT-AD Approach to Improve Coping Compliance with Taking Antiretroviral Drugs (ARV) in HIV/AIDS Patients

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## Abstract

**Background:** Coping toward antiretroviral (ARV) medication adherence refers to cognitive and behavioral strategies used by individuals to manage psychological and treatment-related challenges. This study aimed to develop and evaluate a group counseling model based on the Cognitive Behavioral Therapy–Adherence and Depression (CBT-AD) approach to improve coping with ARV medication adherence among HIV/AIDS patients.

**Methods:** This developmental research employed a modified ADDIE model (Analyze, Design, Development, Implementation, and Evaluation). Content validity was assessed by five experts using Aiken's V coefficient. Practicality was evaluated by five counselors. Preliminary effectiveness was examined using a quasi-experimental one-group pre-test–post-test design involving eight HIV/AIDS patients receiving ARV therapy at the VCT Clinic of RSUP Dr. M. Djamil Padang. Descriptive statistics and inferential analysis were used to evaluate changes in coping scores.

**Results:** The developed CBT-AD group counseling model achieved high content validity (Aiken's V range: 0.75–1.00) and high practicality (Aiken's V range: 0.90–0.95). During the implementation stage, adaptive coping increased from 37.5% at pre-test to 75% at post-test. Statistical analysis demonstrated a significant improvement in coping toward ARV medication adherence following the intervention.

**Conclusion:** The CBT-AD–based group counseling model was valid, practical, and preliminarily effective in improving coping with ARV medication adherence among HIV/AIDS patients. The model may serve as an alternative psychosocial intervention to strengthen adherence-related coping in clinical settings.

**Keywords:** Coping, ARV medication, HIV/AIDS patient, CBT-AD

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## Introduction

Acquired Immune Deficiency Syndrome (AIDS) is a clinical condition caused by Human Immunodeficiency Virus (HIV) infection, characterized by progressive immune system deterioration due to the destruction of Cluster of Differentiation 4 (CD4) cells.<sup>1,2</sup> Continuous viral replication leads to severe immune suppression and increased susceptibility to opportunistic infections.<sup>3</sup> The most effective strategy to suppress viral replication and improve survival outcomes is the administration of antiretroviral therapy (ARV), which inhibits viral replication within CD4 cells.<sup>4</sup>

Despite advances in antiretroviral therapy, HIV remains a major global public health challenge. An estimated 38 million people were living with HIV worldwide, with 25.4 million receiving ARV treatment. In 2019 alone, 1.7 million new infections and 690,000 AIDS-related deaths were reported, with key populations accounting for the majority of new cases.<sup>5</sup> In Indonesia, from 2005 to September 2020, 409,857 HIV cases and 127,873 AIDS cases

were reported, with the highest proportion occurring among individuals aged 25–49 years.<sup>6</sup> West Sumatra ranked among the provinces with a high number of reported cases, indicating an ongoing regional burden of HIV infection.<sup>6</sup>

Although ARV therapy has significantly reduced viral load and improved life expectancy, optimal treatment outcomes depend on high levels of adherence. Evidence suggests that at least 95% adherence to prescribed ARV regimens is required to achieve sustained viral suppression.<sup>7</sup> Poor adherence increases the risk of treatment failure, viral resistance, disease progression, and transmission.<sup>8</sup> However, maintaining long-term adherence remains challenging.

Adherence is not merely a behavioral issue but is strongly influenced by psychological and psychosocial factors. Coping refers to cognitive and behavioral efforts to manage internal and external demands that are appraised as stressful.<sup>9</sup> Among people living with HIV/AIDS (PLHIV), coping strategies play a crucial role in managing stigma, treatment fatigue, side effects, depression, and social isolation.<sup>10</sup> Maladaptive coping strategies may contribute to non-adherence, while adaptive coping supports sustained engagement in care.<sup>11</sup>

Multiple factors influence adherence coping among PLHIV, including stigma, depression, self-motivation, spiritual beliefs, perceived support from healthcare providers, and previous healthcare experiences.<sup>12,13</sup> ARV-related side effects and treatment burden further complicate adherence behavior.<sup>14</sup> The COVID-19 pandemic has additionally disrupted healthcare access and increased treatment interruptions among PLHIV.<sup>15,16</sup>

Psychosocial interventions have been shown to improve psychological well-being and treatment adherence. Cognitive Behavioral Therapy (CBT), particularly the Cognitive Behavioral Therapy–Adherence and Depression (CBT-AD) model, integrates adherence counseling with structured cognitive-behavioral strategies targeting depression and maladaptive beliefs.<sup>17</sup> Previous randomized controlled trials demonstrated that CBT-AD significantly improved ARV adherence and reduced depressive symptoms among PLHIV.<sup>18</sup> Group-based CBT interventions have also been associated with reduced psychological distress and improved quality of life.<sup>19</sup>

In clinical practice at the Voluntary Counseling and Testing (VCT) Clinic of RSUP Dr. M. Djamil Padang, counseling services were primarily delivered by trained counselors using general adherence counseling guidelines. However, a structured and standardized group counseling model integrating CBT-AD specifically targeting coping toward ARV adherence had not yet been developed or implemented. Preliminary findings indicated that a substantial proportion of patients demonstrated maladaptive coping toward ARV adherence, highlighting the need for structured psychosocial intervention.

Therefore, this study aimed to develop and evaluate a group counseling model based on the CBT-AD approach that was valid, practical, and effective in improving coping toward ARV medication adherence among HIV/AIDS patients.

## Methods

### *Study Design*

This study employed a Research and Development (R&D) design using a modified ADDIE model (Analyze, Design, Development, Implementation, and Evaluation) as the fundamental framework for developing the intervention product. The ADDIE model was applied systematically to develop a group counseling model based on the Cognitive Behavioral Therapy–Adherence and Depression (CBT-AD) approach aimed at improving coping with adherence to antiretroviral (ARV) medication among HIV/AIDS patients. The developmental process consisted of five sequential stages: needs analysis, model design, model development, implementation, and evaluation. As a developmental study, this research adopted an iterative and systematic approach, recognizing that the resulting product was not intended to provide fixed or definitive solutions. Instead, the model was refined through continuous evaluation and revision, acknowledging the interconnected nature of research components and the possibility of adjustments throughout the development process.

### *Research Participants*

The participants in this study consisted of four groups across different stages of the research process. At the needs analysis stage, a total of 84 HIV/AIDS patients aged over 15 years who had been taking antiretroviral (ARV) medication for more than six months were involved. They participated in order to describe the condition of coping toward ARV medication adherence. At the validity testing stage, five experts assessed the validity of the developed product. These experts included specialists in guidance and counseling as well as experts in the field of HIV/AIDS. At the practicality testing stage, five counselors evaluated the practicality of the developed model based on its usability and implementation aspects. At the effectiveness testing stage, eight HIV/AIDS patients participated as subjects in the trial implementation of the CBT-AD group counseling model. Their participation aimed to obtain data regarding the effectiveness of the model.

### *Sampling Technique and Procedure*

Participants in the needs analysis stage were recruited from HIV/AIDS patients receiving antiretroviral (ARV) therapy at the VCT Clinic of RSUP Dr. M. Djamil Padang who met the inclusion criteria, namely being diagnosed with HIV/AIDS, undergoing ARV therapy for more than six months, and aged over 15 years.

During the implementation stage, eight HIV/AIDS patients participated in the pilot testing of the CBT-AD group counseling model. The procedure consisted of a pre-test to assess coping toward ARV medication adherence, followed by the structured delivery of CBT-AD group counseling sessions, and concluded with a post-test to evaluate changes in coping after the intervention.

### *Variables and Operational Definitions*

The independent variable in this study was the group counseling model using the CBT-AD approach. The dependent variable was coping toward adherence to taking ARV medication. Coping toward ARV medication adherence was defined as cognitive and behavioral strategies used by HIV/AIDS patients to manage challenges related to ARV treatment, including psychological problems such as depression, hopelessness, and stigma.

### *Instrumentation*

Data on coping toward ARV medication adherence were collected using a coping scale instrument for ARV medication adherence that had met valid and reliable criteria. The instrument validity was tested prior to implementation.

### *Ethical Considerations*

The study was conducted after obtaining formal approval from the relevant institutional authorities. All participants received a comprehensive explanation regarding the research objectives, procedures, and their rights prior to participation. Ethical approval for the study protocol was granted by the Ethics Committee of RSUP Dr. M. Djamil Padang (No. LB.02.02/5.7/384/2022).

### *Data Analysis*

Data analysis was conducted in accordance with the stages of the developmental research process. During the needs analysis phase, descriptive statistical analysis was used to summarize measures of central tendency and variability of coping scores. Content validity of the developed model was analyzed using Aiken's V coefficient to quantify the degree of agreement among experts regarding the relevance and adequacy of the model components. Higher Aiken's V values indicated stronger expert consensus and greater content validity.

Practicality data obtained from counselors were analyzed using descriptive statistics and Aiken's V coefficient to determine the feasibility and usability of the model in clinical practice. The effectiveness of the intervention was evaluated by comparing pre-test and post-test coping scores obtained from participants who underwent the CBT-AD group counseling sessions. Statistical analysis was conducted to determine whether there was a significant improvement in coping toward ARV medication adherence following the intervention.

## Results

### Analysis Stage

The needs analysis stage involved 84 HIV/AIDS patients aged over 15 years who had been receiving ARV therapy for more than six months between November 2022 and January 2023. Based on infection history, the majority of patients were infected through homosexual transmission (45 patients; 53.57%), followed by heterosexual transmission (32 patients; 38.95%), and injection drug users (7 patients; 8.33%). Regarding coping toward ARV medication adherence, most patients demonstrated maladaptive coping. Coping of HIV/AIDS Patient Compliance in Taking ARV Medicine (Tabel 1).

**Table 1.** Coping of HIV/AIDS Patient Compliance in Taking ARV Medicine

Coping Category	Frequency (n)	Percentage(%)
Adaptive	23	27%
Maladaptive	61	73%
<b>Total</b>	<b>84</b>	<b>100%</b>

The results showed that the majority of HIV/AIDS patients demonstrated maladaptive coping toward ARV medication adherence (61 patients; 72.61%), while only 23 patients (27.38%) demonstrated adaptive coping. These findings indicated that maladaptive coping predominated in the study population and provided a strong empirical basis for developing a structured CBT-AD group counseling intervention.

### Design and Development Stage

The CBT-AD group counseling model was developed and validated by five experts. Design Validity Test on Models and Model Guidelines (Tabel 2).

**Table 2.** Design Validity Test on Models and Model Guidelines

Statement	Koef. Aiken's V
The model/guide cover display design is precise and attractive.	0.75
Cover using proper paper.	0.75
The composition of the layout elements on the cover (title, authors, images, logos, etc) are proportional to this layout.	1.00
The contents of the book are attractively designed	1.00
The composition of the layout elements in the book (title, author, images, logo, etc.) is proportional to this layout.	1.00
The size and color of the letters are correct.	1.00
The typeface used is precise, consistent and easy to read.	1.00
The appearance of text, tables, numbers and images is correct.	1.00
Using white paper and printed according to standard sizes.	1.00
The unity of shapes and colors in the book is appropriate.	1.00
The color of the book is contrasting and does not disturb the user while reading	0.75

The expert assessment of the model design dimension showed Aiken's V coefficients ranging from 0.75 to 1.00. Most items achieved a perfect score of 1.00, indicating strong agreement among experts regarding layout composition, typography, readability, and overall design consistency. Three items received a score of 0.75, specifically related to cover design, paper usage, and color contrast. These suggestions were used to refine and improve the final product.

Test the Validity of the Language Dimension on the Model (Tabel 3).

**Table 3.** Test the Validity of the Language Dimension on the Model

Statement	Koef. Aiken's V
Communicative language and according to EYD	1.00
Book in bookeasily accepted by readers.	1.00
The language used is simple, precise and straightforward.	1.00
Capital and lowercase letters are used appropriate.	1.00
The book utilizes straightforward and easily comprehensible terms and words.	1.00
The sentences and paragraphs adhere with standard rules of writing.	1.00
The size of the letters in the book is proportional.	1.00

The language dimension achieved a perfect Aiken's V score of 1.00 for all items. This indicated complete agreement among experts that the language used in the model and manual was communicative, simple, appropriate, and aligned with writing standards.

#### Practicality Stage

The practicality of the model was assessed by five counselors. Model Practicality Validity Test on the Content Dimension (Tabel 4).

**Table 4.** Model Practicality Validity Test on the Content Dimension

Statement	Koef. Aiken's V
Ease of each component contained in the model	0.95
Ease of each component done individually or in groups	0.95
It is easy to understand and can be carried out by counselors in the development of group counseling using the cognitive behavioral therapy-adherence (CBT-AD) approach to improve coping with medication adherence <i>Antiretrovirals</i> (ARV)	0.95
Can be applied to improve coping adherence to antiretroviral medication (ARV)	0.90
Group counseling activities use the cognitive behavioral therapy-adherence (CBT-AD) approach to improve coping drinking adherenceantiretroviral drugs (ARVs) are appropriate and easy to administer	0.90

The Aiken's V coefficient for the content dimension ranged from 0.90 to 0.95. These results indicated that counselors considered the model easy to understand, applicable, and appropriate for improving coping toward ARV medication adherence.

Model Practicality Test on the Usefulness Dimension (Tabel 5).

**Table 5.** Model Practicality Test on the Usefulness Dimension

Statement	Koef. Aiken's V
The usefulness of the group counseling model using the cognitive behavioral therapy-adherence (CBT-AD) approach to improve coping with adherence to taking antiretroviral drugs (ARV)	0.95
The usefulness of group counseling model guidelines using the cognitive behavioral therapy-adherence (CBT-AD) approach to improve coping with adherence to taking antiretroviral drugs (ARV)	0.95

The usefulness dimension obtained an Aiken's V score of 0.95. Counselors agreed that the model and its guidelines were beneficial and practical for assisting HIV/AIDS patients in improving coping related to ARV medication adherence.

## Model Practicality Test on Language Use (Tabel 6)

**Table 6.** Model Practicality Test on Language Use

Statement	Koef. Aiken's V
The language used in the CBT-AD group counseling model book is easy to understand	0.90
The language used in the model manual CBT-AD group counseling is easy to understand	0.90

The Aiken's V coefficient for language use was 0.90, indicating that counselors found the language used in the model and manual clear and understandable, supporting the overall practicality of the product.

*Implementation Stage (Effectiveness Testing)*

Effectiveness testing involved eight HIV/AIDS patients who participated in CBT-AD group counseling sessions. Recapitulation of Coping Trials Before and After CBT-AD Group Counseling (Tabel 7).

**Table 7.** Recapitulation of Coping Trials Before and After CBT-AD Group Counseling

	Pre-test		Post-test	
	n	%	n	%
Adaptive	3	37.5	6	75
Maladaptive	5	62.5	2	25

Before the intervention, adaptive coping was observed in 3 (37.5%) participants, whereas maladaptive coping was identified in 5 (62.5%) participants. After the implementation of the CBT-AD group counseling intervention, adaptive coping increased to 6 (75%), while maladaptive coping decreased to 2 (25%).

*Evaluation Stage*

Based on the evaluation process, revisions were made to improve model guidelines, particularly in clarifying coping conditions related to ARV medication adherence and enhancing counselor readiness to implement the CBT-AD model effectively. The evaluation stage identified the need for minor revisions in the model guidelines, particularly in clarifying coping conditions related to ARV medication adherence and enhancing counselor readiness to implement the CBT-AD model more effectively. Overall, based on the results of validity testing, practicality testing, and effectiveness testing, the CBT-AD group counseling model met the criteria of being valid, practical, and effective in improving coping toward ARV medication adherence among HIV/AIDS patients.

**Discussion**

Coping refers to cognitive and behavioral efforts used to manage internal and external demands perceived as stressful.<sup>9</sup> In individuals living with HIV/AIDS, stressors include lifelong medication use, stigma, fear of disclosure, social rejection, treatment fatigue, and uncertainty about disease progression.<sup>10-12</sup> When coping mechanisms are inadequate, individuals may develop maladaptive responses such as denial, avoidance, hopelessness, or disengagement from treatment, which can negatively affect adherence behavior.<sup>11,13</sup>

Previous studies have demonstrated that depression, internalized stigma, and psychological distress are significantly associated with poor ARV adherence.<sup>12,14</sup> Therefore, strengthening adaptive coping is essential to support sustained engagement in treatment. The predominance of maladaptive coping found in this study underscores the need for structured psychosocial interventions targeting cognitive and emotional processes related to adherence.

The expert validation results demonstrated Aiken's V coefficients ranging from 0.75 to 1.00, indicating strong agreement among experts regarding the design, structure, and language of the developed model. High validity scores reflect that the CBT-AD group counseling model was conceptually grounded and systematically

structured. The CBT-AD approach integrates cognitive behavioral strategies with adherence-focused counseling techniques.<sup>17</sup> This integration is particularly relevant for HIV/AIDS patients, as adherence difficulties are often intertwined with depressive symptoms and maladaptive beliefs about treatment.<sup>18</sup> The high agreement in the language dimension (Aiken's  $V = 1.00$ ) further suggests that the model guidelines were clear and understandable, supporting implementation fidelity. These findings confirm that the developed model met acceptable academic and theoretical standards before field application.

Practicality testing conducted by professional counselors yielded Aiken's  $V$  coefficients ranging from 0.90 to 0.95 across content, usefulness, and language dimensions. These results indicate that the model was considered feasible and applicable in clinical settings.

In the context of HIV care, counseling services must be practical and adaptable to routine clinical workflows. The high practicality scores suggest that the CBT-AD group counseling model was structured in a way that supports counselor implementation without excessive procedural burden. The clarity of intervention steps and structured session flow contributed to its usability in VCT settings.

Practicality is a critical component in developmental research, as a theoretically sound model must also demonstrate feasibility in real-world contexts. The findings indicate that the model possesses both conceptual strength and operational readiness.

The implementation stage demonstrated an increase in adaptive coping from 37.5% at pre-test to 75% at post-test, accompanied by a reduction in maladaptive coping from 62.5% to 25%. These results suggest that the CBT-AD group counseling intervention contributed to measurable improvements in coping toward ARV medication adherence. CBT-AD emphasizes cognitive restructuring, behavioral activation, and adherence-focused strategies that directly address maladaptive thoughts and behaviors associated with treatment non-adherence.<sup>17,18</sup>

Through cognitive restructuring, participants were encouraged to identify and modify negative automatic thoughts related to ARV treatment, such as hopelessness or fear of side effects. Behavioral components supported structured medication routines and problem-solving strategies. The group format further facilitated peer support, shared experiences, and normalization of psychological difficulties, which may strengthen adaptive coping responses.

The observed improvement aligns with previous evidence demonstrating that CBT-based interventions improve adherence outcomes and reduce depressive symptoms among individuals living with HIV/AIDS.<sup>18-20</sup> These findings support the theoretical assumption that modifying cognitive appraisal processes can enhance coping capacity and treatment engagement.<sup>9</sup>

The findings of this study reinforce the understanding that ARV adherence is influenced not only by biomedical factors but also by psychological and behavioral determinants. Coping plays a central role in sustaining long-term treatment engagement.

The CBT-AD group counseling model offers a structured psychosocial intervention that integrates evidence-based cognitive behavioral strategies with adherence counseling. Given its demonstrated validity, practicality, and preliminary effectiveness, the model may serve as an alternative approach for strengthening coping toward ARV medication adherence within VCT services.

Future research with larger samples and controlled designs is recommended to further evaluate the long-term effectiveness of the model.

## Conclusions

This study developed a group counseling model using the Cognitive Behavioral Therapy–Adherence and Depression (CBT-AD) approach to improve coping toward antiretroviral (ARV) medication adherence among HIV/AIDS patients. The needs analysis indicated that maladaptive coping predominated among patients receiving ARV therapy, highlighting the necessity for structured psychosocial intervention.

These findings indicate that the CBT-AD group counseling model met the criteria of being valid, practical, and effective in improving coping related to ARV medication adherence. The model may serve as an alternative psychosocial intervention to support adherence behavior in HIV/AIDS counseling services.

Further research involving larger samples and controlled study designs is recommended to strengthen evidence regarding long-term effectiveness and broader applicability.

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## Declaration concerning generative AI and AI-augmented technologies in the compositional process

In the course of preparing this paper, the authors utilized ChatGPT to enhance readability and linguistic quality. Subsequent to utilizing this tool/service, the writers assessed and amended the information as necessary and assume complete accountability for the publication's content.

## Declarations of competing interest

No potential competing interest was reported by the authors.

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